REMARKS

Claims 1-4, 8-34 are pending in the application. Claims 1, 12 and 20 are currently amended. Claims 14-19 and 21-34 have been previously withdrawn without prejudice. Claims 5-7 have been previously cancelled. Claims 1-4, 8-13 and 20 are under consideration.

Applicant appreciates Examiner's withdrawal of the previous rejection of Claim 20.

Claims 1, 12 and 20 have been amended to recite that the soybean sample has not been infected by the soybean cyst nematode. Support for this amendment can be found in the Specification as originally filed. *See e.g.*, Paragraph 78 on page 20, stating that "presence of SCN is not required to distinguish between SCN resistant and susceptible genotypes. Visual correlation analysis of spectra also confirm the lack of interaction between inoculation and spectra. This allows breeders to screen populations of experimental lines without having to inoculate them with SCN." *See also* Paragraph 64 on page 15, stating that "[a] discriminate analysis was also performed to distinguish between plants that had been inoculated with SCN and those that had not." These examples along with the rest of the entire disclosure indicate that the instant invention is at least partly applicable to a situation where uninfected soybean samples are scanned using NIR and the spectra are used to predict the degree of resistance to SCN.

No new matter has been introduced by these amendments.

I. Claim Rejections – 35 U.S.C. §103 over Qiu in view of Yuhara and Rutherford.

Claims 1, 2, 4, 8-13 and 20 stand rejected under 35 U.S.C. §103(a) as being obvious over Qiu et al. (Journal of Nematology, 1997, Vol. 29, 523-30) ("Qiu" hereinafter), in view of Yuhara, Res. Bull. Hokkaido National Agriculture Experiment Station, 1975, No. 111, p91-100; Japanese translation document ("Yuhara" hereinafter),

and Rutherford, Journal of Chemical Ecology, 1998, Vol. 24, No. 9, p1447-63 ("Rutherford" hereinafter). Applicant respectfully disagrees.

Obviousness is a question of law based on underlying factual inquiries. The factual inquiries (also known as the "Graham factual inquiries") to be performed by the Examiner are as follows:

(1) Determining the scope and content of the prior art;

(2) Ascertaining the differences between the claimed invention and the prior art; and

(3) Resolving the level of ordinary skill in the pertinent art.

Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc., Federal Register, Vol. 72, No. 195, 57526-35, 57526 (October 10, 2007)("Examination Guidelines" hereinafter). Once the Graham factual inquiries are resolved, the Examiner must determine whether the claimed invention would have been obvious to one of ordinary skill in the art. Prior art is not limited just to the references being applied, but includes the understanding of one of ordinary skill in the art. Although the prior art reference (or references when combined) need not teach or suggest all the claim limitations, the Examiner must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art. *Id.* 57528.

The instant application disclosed and claims a method for predicting the capability of a soybean sample to resist soybean cyst nematode using a spectrometer. One important limitation of claim 1 is the term "predict" which means to declare or to indicate in advance. Thus, claim 1 requires that the method be used to foretell whether a given soybean sample is resistant or susceptible to SCN infection. None of the cited references teach or suggest that the method can be used to foretell whether or not a given soybean sample is resistant to SCN infection. When a soybean sample (or plant) is infected with SCN and the infected sample (or plant) is observed to determine whether it

is resistant to such an infection, such a practice is more appropriately called determining (or detecting), but not predicting, whether the sample (or plant) is resistant to infection.

As acknowledged by the Examiner, Qiu does not specifically teach predicting resistance based on comparing assay spectra and a predictive model. See page 4 of the instant Office Action dated 2/4/2010. Indeed, Qiu never teaches that resistant and susceptible soybean strains exhibit different levels of chitinase before infection or infestation. *See* Fig. 1A on page 526 of Qiu, showing that the chitinase activities remain the same when no *Meloidogyne* is used to infect the resistant cultivar and susceptible cultivar. Qiu further discloses that resistant cultivar and susceptible cultivar only begin to show differences in chitinase activity 3 days after infestation (referred to as "DAI" in Qiu).

Although Rutherford discloses to a method for predicting sugarcane resistance to certain stalk borers, sugarcane is not soybean, and stalk borer is different from soybean nematode. Just because a method can be used to predict sugarcane resistance to certain stalk borers does not mean that the same method can be applied to predict soybean resistance to SCN. Rutherford never mentions or suggests that its method for predicting sugarcane resistance to stalk borer can be modified to predict soybean resistance to SCN.

Yuhara teaches a method to detect existing plant injury caused by soybean nematode. *See e.g.*, page 91 of the original Yuhara reference, or lines 17-21 on page 2 of the translated document provided by the Examiner. Yuhara teaches using infrared color films that form an image when exposed to infrared light. *See* lines 20-23 on page 3 of the translated document. Yuhara further teaches using different filters to capture multispectral images of the soybean crops at a distance, for example, from an airplane. *See* lines 1-11 on page 4 of the translated document. Yuhara fails to teach or suggest that infrared picture of soybean crops can be used to predict soybean resistance to SCN. To take pictures of a field of plants that have been infected by a pathogen and determine the severity of the infection is a process of assessing the damage, but not predicting whether the plants are resistant to the infection.

As explained above, the term "predict" requires that the determination be made in advance, not after the facts. Yuhara never teaches or suggests taking infrared picture of an uninfected soybean plant and determine whether such a plant would be resistant to SCN infection if it were inoculated with SCN. Yuhara never shows that SCN resistant soybean plants would look any different from SCN susceptible soybean plants on an infrared picture before the plants have been infected by SCN. Such an observation would be required if the infrared photography of Yuhara were to be used to predict SCN susceptibility. On the contrary, the Yuhara methodology is based on the observation that soybean plants that have been infected by SCN appear different from soybean plants that have not been infected. Normally, such a difference can be readily discerned by an experienced farmer during a close-up examination of the plants. The Yuhara method is interesting in that it employed infrared photography to take aerial pictures of the entire field from high above and was able to tell which area of the field has been more severely infected by the pathogen. Taken together, the most important difference between Yuhara and Applicant's methodology is that Yuhara's methodology is only applicable after SCN infection has occurred and can be used in detecting SCN infection, whereas Applicant's claimed invention is useful in predicting SCN susceptibility before any SCN infection has occurred.

The Examiner maintained that Applicant's "arguments are directed to features (i.e. uninfected samples or predicting SCN resistance in future plants grown from assayed seed) that are not recited in the instant claims." Page 6 of the instant Office Action dated 2/4/2010. While Applicant respectfully disagrees with the Examiner, Applicant has now amended the claims to expressly recite the limitation that the assayed sample is uninfected. As explained above, none of the cited references teach the use of NIR scanning to predict the SCN susceptibility of a soybean sample that has not been infected by SCN.

The Examiner further asserted that Applicant fails to point to specific location in Qiu where it is shown that the chitinase activities are similar between the resistant cultivar and susceptible cultivar prior to or at the time of infestation. Applicant did point out the specific showing in Qiu in the last response dated 10/7/09. However, for the

convenience of the Examiner, Applicant reiterates that Figure 1A of Qiu teaches away from the instant invention by showing that chitinase activity is not a good indicator for predicting susceptibility because the chitinase activities are the same or similar between uninfected resistant cultivar and uninfected susceptible cultivar. See Figure 1A on page 526 of Qiu.

Thus, neither Qiu, nor Yuhara, nor Rutherford, either alone or in combination, teaches or suggests that spectroscopic scan of an uninfected soybean sample can be used to predict the relative SCN susceptibility of the soybean sample. Withdrawal of the obviousness rejection is respectfully requested.

II. Claim Rejections – 35 U.S.C. §103 over Qiu in view of Yuhara and Rutherford, Borggaard and Marek.

Claims 1-4, 8-13 and 20 stand rejected under 35 U.S.C. §103(a) as being obvious over Qiu in view of Yuhara and Rutherford, and further in view of Borggaard et al. (Anal. Chem. 1992, 64:545-51) ("Borggaard") and Marek et al. (Crop Sci., 2000, vol. 40, p713-16) ("Marek" hereinafter). Applicant respectfully disagrees.

The Examiner relies on Borggaard to provide support for the neural networks for optimally interpreting NIR spectra. The Examiner further relies on Marek to provide support for assaying the chitinase activity in a plant seedling sample by using NIR spectroscopy. Borggaard and Marek do not cure the defects of Qiu, Yuhara and Rutherford, as explained above in Section I. This is so because at the time of the present invention, nothing in the cited references or in the common knowledge would suggest to one of skill that chitinase would be a reliable indicator for predicting SCN susceptibility of a given uninfected soybean sample. In fact, as mentioned above in Section I, the cited references, if anything, teach away from the instant invention by suggesting to one of skill in the art that there is no significant difference in chitinase activities between resistant and susceptible cultivar prior to infestation. Therefore, because Applicant's claimed invention is not obvious over the cited references, withdrawal of the obviousness rejections is respectfully requested.

For the foregoing reasons, Applicant's attorney respectfully solicits a Notice of Allowance. Applicant believes no additional fees are due at this time other than the fees for a two month extension of time and RCE. However, if any fees are deemed necessary in connection with this filing, the Commissioner is hereby authorized to charge deposit account No. 12-0600.

Respectfully submitted,

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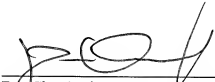

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